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SOME SPECIES OF *SMICRONYX* (COLEOPTERA: CURCULIONIDAE)
ASSOCIATED WITH *CUSCUTA* SPECIES (CONVOLVULACEAE)
IN PAKISTAN

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ABSTRACT—The 7 species of *Smicronyx* found in association with dodders (*Cuscuta* spp.) in Pakistan are separated in a key, and 5 of them are described as new. All available records on their biology and distribution are summarized, and the apparent relatedness of 3 of them to species associated with parasitic Scrophulariaceae is noted.

The following descriptions, notes, and key are based primarily upon specimens of *Smicronyx* (subg. *Smicronyx*) Schoenherr, collected or reared in the course of studies conducted by Dr. M. A. Ghani on insects with potential as biological control agents against dodders (*Cuscuta* spp.) in Pakistan. I have prepared them in answer to a need for names for several undescribed species represented in that material and to provide a means of identifying the *Smicronyx* species known to be associated with dodders in Pakistan.

In determining the status of the species included in this study, I examined 1 or more examples from the type series of 4 of the 6 species described from the Oriental Region and of 4 of the 5 species described from the nearby Turkestan area of the Palearctic Region. These species are *Smicronyx anthracinus* Faust, *S. balassogloi* Faust, *S. bituberculatus* Faust, *S. centropustulatus* Faust, *S. praecox* Faust, *S. robustus* Faust, *S. roridus* Marshall, and *S. tataricus* Faust. I also examined descriptions and identified specimens of the remaining 2 Oriental species.

For a recent diagnostic description of the genus *Smicronyx*, see Hoffmann (1958), who also distinguished it from *Sharpia* Tournier, the other genus of the tribe Smicronychini known to occur in Pakistan. The descriptions of *Smicronyx* and of the subgenus *Smicronyx* by Anderson (1962) will fit the species treated here, except for the

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minutely toothed femora of most of the species known to occur in Pakistan.

The specimens examined in this study belong to the following institutions.

BM—British Museum (Natural History).

CIBC—Commonwealth Institute of Biological Control, Pakistan Station, Rawalpindi.

DM—Staatliches Museum für Tierkunde, Dresden, German Democratic Republic.

USNM—United States National Museum of Natural History, Washington, D.C.

In making the measurements given with the descriptions, I measured the body length from the base of the rostrum to the apices of the elytra and measured the maximum body width across the elytra. N = the number of specimens measured and Av. = average of all measurements. The line figures were drawn with the aid of a microprojector and either a compound or stereoscopic microscope.

Key to Species of *Smicronyx* Known to be Associated with *Cuscuta* in Pakistan

1. Body color of fully colored specimens entirely black; punctures of prothorax small, shallowly depressed or slightly raised at center (fig. 9, 10); vestiture some combination of dark brown, yellowish or reddish brown, and white 2
- Body color of fully colored specimens entirely or partly reddish or brown; punctures of prothorax larger and moderately deep; vestiture mostly white, yellow, or pale reddish brown, mottled with dark brown 5
2. Femora armed with a small ventral tooth (may be concealed by scales) (fig. 12); dorsal vestiture of prothorax and elytra mostly yellowish brown and dark brown, with small scattered clusters of white (fig. 1-3); internal sac of male genitalia without helical scleromes 3
- Femora not armed with a ventral tooth; dorsal vestiture of prothorax and elytra light to medium brown, with fewer and larger patches of white (fig. 4, 5); internal sac of male genitalia with a pair of toothed helical scleromes (fig. 27) 4
3. Vestiture of prothorax and elytra almost entirely medium reddish brown, except for white scales covering humeri and scattered across basal area of elytra (fig. 3); dorsal punctures of prothorax confluent, forming shallow longitudinal furrows; larger species, length 2.60 mm or more; male genitalia as in fig. 26 *sp.*, prob. *robustus* Faust
- Vestiture of prothorax and elytra medium yellowish brown, mottled with dark brown, and with scattered patches of white (fig. 1, 2); punctures of prothorax not confluent; smaller species, length less than 2.40 mm; male genitalia as in fig. 25 *roridus* Marshall
4. Dorsal surface of prothorax shining, with small wrinkles between punctures (fig. 9) and usually with a few rugae running anterolaterally from base; vestiture thinly covering surface; most white scales in broken ir-

- regular clusters (fig. 4); male & female genitalia as in fig. 27 & 35 -----
 *ghanii* Anderson
- Dorsal surface of prothorax finely reticulate, faintly shining, without wrinkles or rugae between punctures (fig. 10); vestiture closely covering surface; most white scales of elytra in dense patches (fig. 5); male and female genitalia as in fig. 28 & 36 ----- *ushoensis* Anderson
5. Dorsal surface of each elytron with a broad reddish stripe running from humerus to top of declivity; vestiture of elytra a mixture of light reddish brown (heavy over reddish stripe), dark brown, and white; length 1.65–2.00 mm; median lobe of male genitalia (fig. 31) lightly pigmented -----
 *rufovittatus* Anderson
- Dorsal surface of elytra almost entirely reddish brown except for narrow dark sutural stripe; vestiture of elytra mostly white and/or yellow; length 1.90–2.80 mm; median lobe of male genitalia darkly pigmented dorsally and laterally ----- 6
6. Vestiture of elytra mostly yellow with a few clusters of white, the yellow condensed in a subfasciate pattern (fig. 7); dorsal punctures of prothorax subconfluent, interspaces forming anterolaterally oriented rugae; male genitalia as in fig. 29 ----- *parafasciatus* Anderson
- Body vestiture grayish, almost translucent white, except for brownish setiform scales; subfasciate pattern of elytra rather faint (fig. 8); dorsal punctures of prothorax not subconfluent; male genitalia as in fig. 30 -----
 *inornatus* Anderson

Smicronyx roridus Marshall

fig. 1, 2, 11, 12, 25, 33

Smicronyx cuscutae Marshall, 1923. Ann. Mag. Nat. Hist., Ser. 9, 12:288–289 (preoccupied by *cuscutae* Brisout, 1878).

Smicronyx roridus Marshall, 1952. Ann. Mag. Nat. Hist., Ser. 12, 5(51):267.

This species was described as *Smicronyx cuscutae* by Marshall (1923) from a series “. . . bred from larvae living in galls on the stems of *Cuscuta reflexa*” collected in Pusa, Bihar State, India. More recent collecting records indicate that it is a gall maker on stems of *Cuscuta* species in both India and Pakistan. In a survey of all the specimens listed here, it became apparent that the color pattern of dorsal scales includes many more dark scales in some specimens (fig. 1) than in others (fig. 2). However, this variation is continuous, and although series of specimens from some localities (e.g. Beha, Rawalpindi, and Said Pur in Pakistan) show the dark pattern more markedly than series from other localities (e.g. Pusa and Allahabad in India, Quetta in Pakistan), no anatomical differences could be correlated with the color variation. The host data on the specimen labels and that published by Ghani (1969) revealed no apparent biological differences that could be correlated with the color variation. Therefore, the specimens examined are interpreted here as representatives of one species.

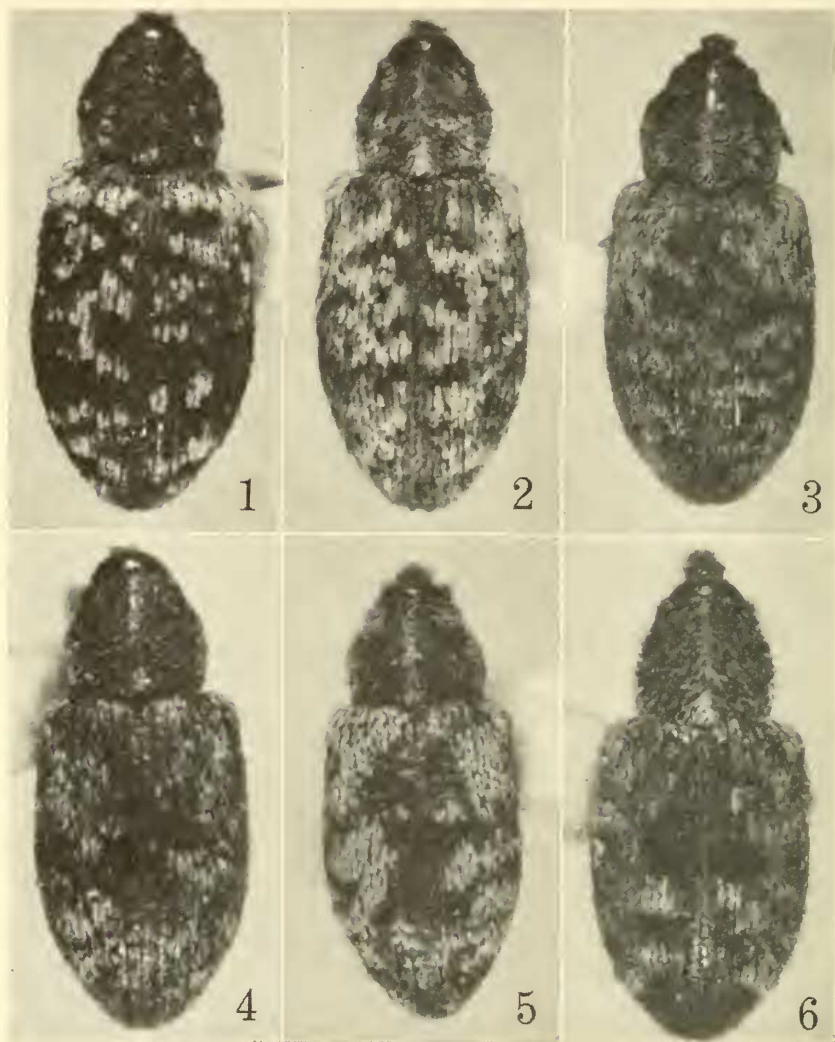


Fig. 1-6. *Smicronyx* species, dorsal view. 1, *S. roridus* ♀, dark extreme. 2, *S. roridus* ♂, light extreme. 3, *S. sp.*, prob. *robustus* ♀. 4, *S. ghanii* ♂, holotype; elytral scales slightly abraded at center. 5, *S. ushoensis* ♂, holotype. 6, *S. rufovittatus* ♂, holotype.

As may be apparent in the preceding key, *S. roridus* does not closely resemble any of the other *Cuscuta*-infesting species of *Smicronyx* in Pakistan. Marshall (1923) indicated that this species resembles *Smicronyx albovariegatus* Faust more closely than the other species previously described from India, but he noted that it differs from *S.*

albovariegatus, which has deeper punctures on the prothorax, white vestiture condensed at the sides and midline of the prothorax, more reddish legs and antennae, and narrower, more pointed elytral scales. As Marshall (loc. cit.) also indicated, *S. roridus* is similar to *Smicronyx tataricus*, described by Faust (1886) from Russian Turkestan, but in that species the elytra are narrower, with more numerous white scales, and the median carina of the rostrum is not flattened between the antennae.

Length: 1.90–2.30 (Av. 2.16) mm. Width: 0.80–1.05 (Av. 0.95) mm. Width of prothorax: 0.55–0.70 (Av. 0.65) mm. Length of prothorax: 0.16–0.60 (Av. 0.57) mm. N = 19.

Specimens examined: INDIA: Bihar, Pusa, iii, 1921 (Rangi), larvae in galls on stems *Cuscuta reflexa* (2 syntypes, BM); Allahabad, 1967, ex gall on stem of *Cuscuta* sp., B. D. Agarwal (5, BM). PAKISTAN: Beha (Swat), 19-VII-69, adult on *C[uscuta] reflexa* (1, CIBC); Choprial (Swat), 12-IX-69, adult on *C[uscuta] reflexa* (5, CIBC); Marghuzar (Swat), 20-VII-69, adult on *C[uscuta] reflexa* (1, CIBC); Quetta, 1-VII, 1 & 5-VIII-1967, adults from galls on *C[uscuta] monogyua* (7, CIBC), [no date], 1967, adults on stems of *C[uscuta] monogyua* (8, CIBC); Rawalpindi, 4-5-61, grub in *Cuscuta reflexa* stem (1, BM, 1, CIBC, 2, USNM); Said Pur, Rawalpindi, 15-VII-1969, adult on *C[uscuta] reflexa* (8, CIBC).

Smicronyx sp., prob. *robustus* Faust

fig. 3, 26, 34

This species is probably *Smicronyx robustus*, described by Faust (1885) from Tashkent (in Uzbek, USSR), but apparently not recorded in the literature again, except for being listed in the Junk catalog (Klima, 1934). It superficially resembles *S. roridus* Marshall in general conformation, color of body surface, and carination of the rostrum but differs from that species by the characters given in the key and in the shape of the broad scales of the prothorax, which are almost pointed at the apex in this species, but are broadly rounded at the apex in *S. roridus*. Another difference appears in the median lobe (penis) of the male genitalia, which is more distinctly broadened from base to apex in *S. sp.*, prob. *robustus* (fig. 26) than it is in *S. roridus* (fig. 25). My identification of the material seen is tentative, as it is based upon the rather brief original description, plus notes and a photograph taken when I examined a male syntype of *S. robustus*, but not upon direct comparison with that specimen, which had been returned to the Dresden Museum before this material was collected.

Length: 2.80–3.25 (Av. 3.08) mm. Width: 1.25–1.42 (Av. 1.39) mm. Width of prothorax: 0.80–1.00 (Av. 0.93) mm. Length of prothorax: 0.70–0.90 (Av. 0.81) mm. N = 7.

Material examined: AFGHANISTAN: Sheik Ali, 8-IX-72, adults on *Cuscuta reflexa* v. *brachystigma* (3, CIBC, 1, USNM). PAKISTAN: Garam Chasna Chitral Division, 9-7-72, adults on *Cuscuta reflexa augunia* (2, CIBC, 1, USNM).

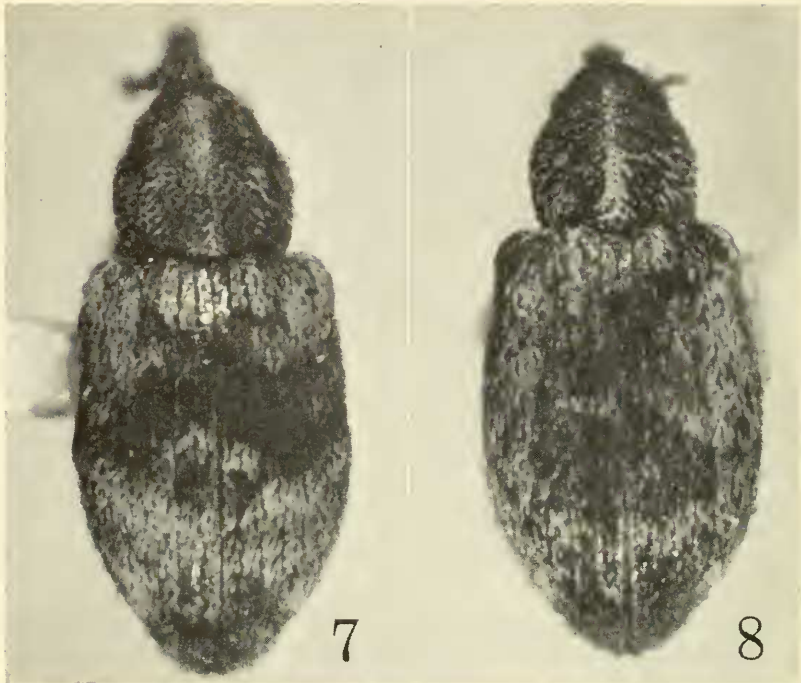


Fig. 7-8. *Smicronyx* species, dorsal view. 7, *S. parafasciatus* ♂, holotype; scales dark, obscure in central patch. 8, *S. inornatus* ♂, holotype.

Smicronyx ghauii Anderson, new species

fig. 4, 9, 13, 19, 27, 35

Body and appendages entirely black to reddish black. Rostrum moderately stout, not strongly curved, shallowly punctured toward base, bearing 1 lateral carina on each side, and 3 dorsal carinae, the median divided between and before the antennal insertions. Basal scale tufts of rostrum erect but not prominent. Head finely reticulate, thinly squamose in front. Antenna bearing greyish-white linear scales on funicle. Prothorax slightly broader than long, moderately rounded at sides, and distinctly but not suddenly narrowed at apex; dorsal punctures shallow, almost round, convex at center (fig. 9); surface shining, with small wrinkles and often with low anterolaterally oriented rugae at base; broad scales elliptical, sparse, mostly yellowish brown, but white at sides posteriorly; setiform scales narrow, slightly arched. Elytra broadest slightly behind the middle; humeri not prominent; surface shining, thinly clothed with a mixture of yellowish brown and white elliptical scales, and with a row of recumbent setiform scales on each interval. Underside thinly clothed with a mixture of broad and narrow brown and white scales. Femora moderately clavate, unarmed or bearing a minute ventral tubercle; thinly covered with a mixture of narrow and elliptical greyish-white scales. Tibiae thinly covered with elongate grey or light brown

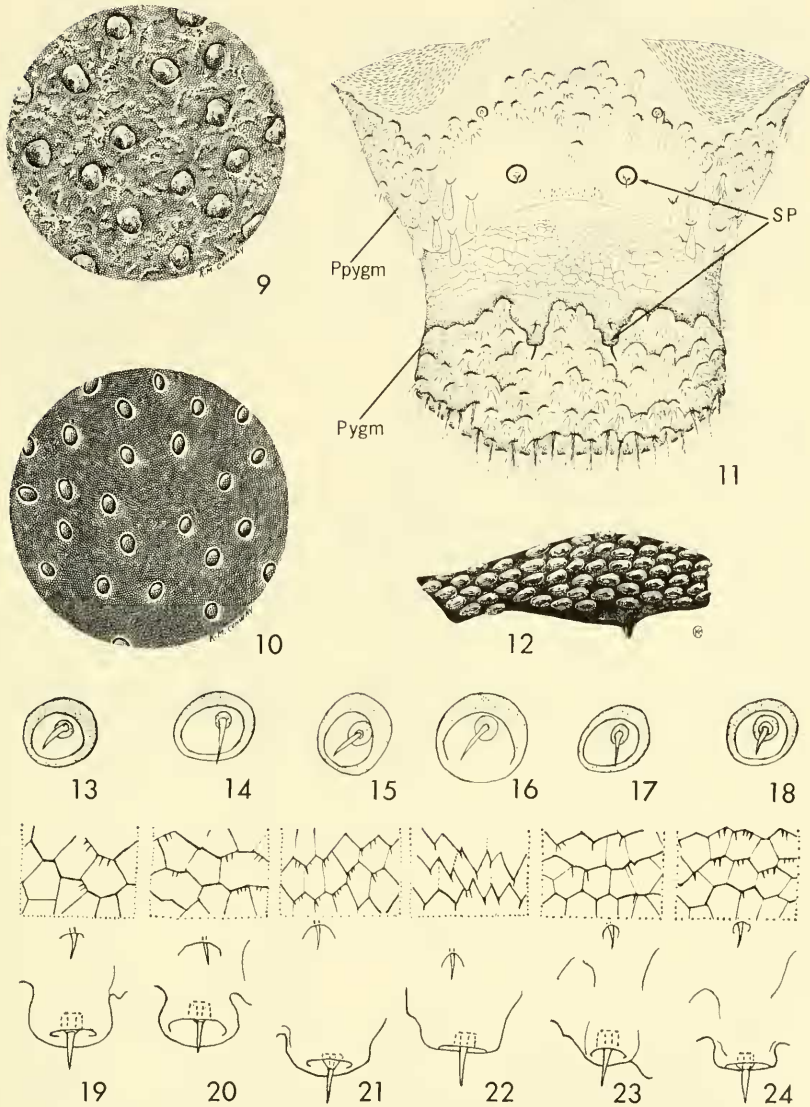


Fig. 9-10. *Smicronyx* species, surface texture of prothorax, dorsocentral area. 9, *S. ghanii*. 10, *S. ushoensis*. Fig. 11-12. *S. roridus*: 11, pygidium (Pygm) and propygidium (Ppygm), dorsal view (SP, setiferous pits). 12, front femur, lateral view, denuded ventrally to show tooth. Fig. 13-18. Setiferous pits of ♂ propygidium. 13, *S. ghanii*. 14, *S. ushoensis*. 15, *S. parafasciatus*. 16, *S. inornatus*. 17, *S. rufovittatus*. 18, *S. albovariegatus*. Fig. 19-24. Surface texture (above) and setiferous pits (below) of ♂ pygidium. 19, *S. ghanii*. 20, *S. ushoensis*. 21, *S. parafasciatus*. 22, *S. inornatus*. 23, *S. rufovittatus*. 24, *S. albovariegatus*.

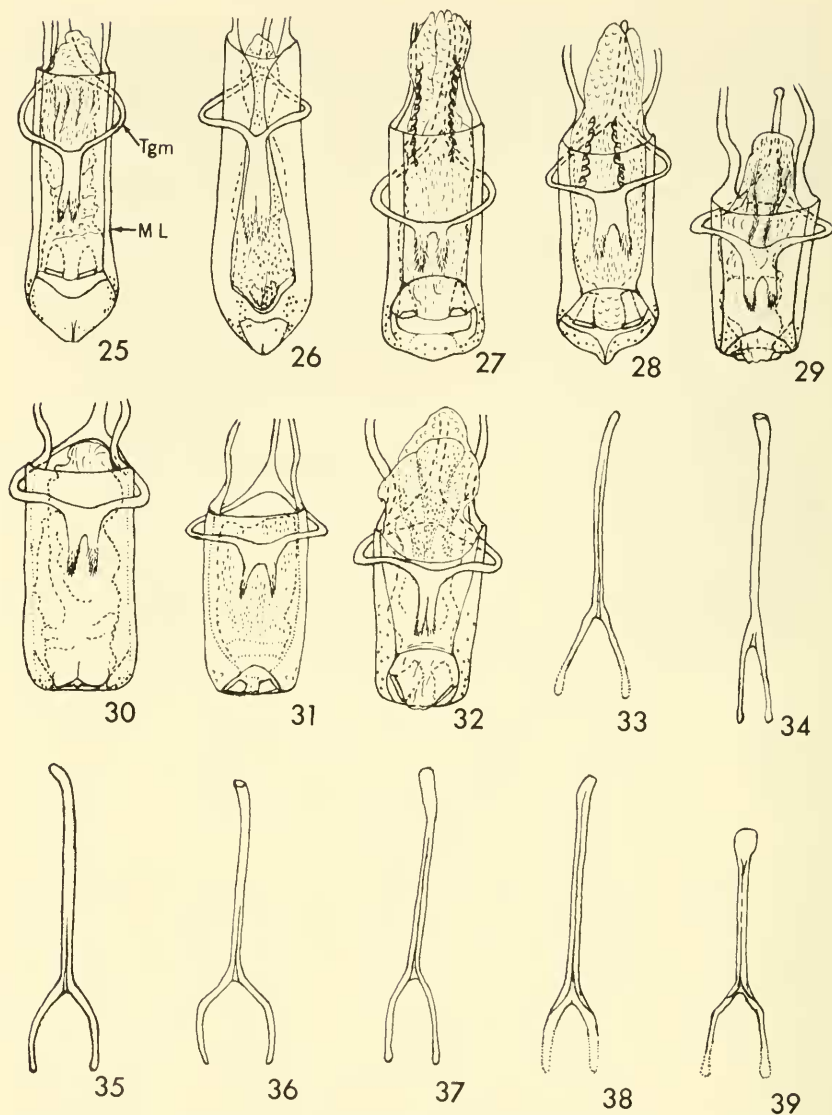


Fig. 25-32. *Smicronyx* species, median lobe (ML) and tegmen (Tgm) of ♂ genitalia (struts not entirely shown), dorsal view. 25, *S. roridus*. 26, *S. sp.*, prob. *robustus*. 27, *S. ghanii*. 28, *S. ushoensis*. 29, *S. parafasciatus*. 30, *S. inornatus*. 31, *S. rufovittatus*. 32, *S. albovariegatus*. Fig. 33-39. Spiculum ventrale of ♀ genitalia. 33, *S. roridus*. 34, *S. sp.*, prob. *robustus*. 35, *S. ghanii*. 36, *S. ushoensis*. 37, *S. parafasciatus*. 38, *S. inornatus*. 39, *S. rufovittatus*.

scales; all but hindtibiae bearing a row of 4 or 5 stiff setae along inner margin; apical process distinctly curved. Fourth tarsomere not longer than combined length of preceding 2; tarsal claws fused for approximately half their length and nearly parallel. Male genitalia (fig. 27) with median lobe (penis) more heavily sclerotized and pigmented at sides than above or below, subparallel at sides, slightly broadened at apex; internal sac microspiculate and armed with a pair of toothed helical scleromes; tegmen bearing a deeply cleft cap-piece; spiculum gastrale fairly stout, darkly pigmented, curved but not hooked at anterior end. Paired setiferous pits of male propygidium as in fig. 13. Surface texture and paired setiferous pits of male pygidium as in fig. 19. Female genitalia with spiculum ventrale (fig. 35) rather long, flattened and slightly curved at anterior end.

Females are almost indistinguishable from males externally, except for the rostrum, which is slightly narrower, more elongate, and more polished before the antennal insertions.

Length: 1.40–2.15 (Av. 1.85) mm. Width: 0.65–0.92 (Av. 0.84) mm. Width of prothorax: 0.50–0.65 (Av. 0.59) mm. Length of prothorax: 0.45–0.60 (Av. 0.53) mm. N = 18.

Holotype: ♂, USNM No. 73236, labelled Otrore [Pakistan], 17-VII-69, adult on *C[uscuta] planiflora*, C.I.E. Coll. A. 3372.

Paratypes: Same data as for holotype, 8 ♂♂, 1 ♀ (5, CIBC, 4, USNM); Otrore, Swat State, on *Cuscuta europea* L. var. *indica*, M. Ghani, Brit. Mus. 1968–508, 2 ♂♂, 4 ♀♀ (BM); Usho [Pakistan], 8-VIII-69, adult on *C[uscuta] planiflora*, 1 ♂, 1 ♀ (USNM).

This species is named for Dr. M. A. Ghani, who first collected it at Otrore, Pakistan, in 1968. It is the *Smicronyx* species "A" that Ghani (1969) reported having reared from *Cuscuta europea* var. *indica* and *C. planiflora* at Otrore and on which he reported some feeding and oviposition tests.

Differences between this species and the similar, undoubtedly related, *S. ushoensis* n. sp. are indicated in the key.

Smicronyx ushoensis Anderson, new species

fig. 5, 10, 14, 20, 28, 36

Body and appendages entirely black to reddish black. Rostrum moderately thick and curved, not strongly tapered in either sex; bearing 4 carinae dorsally and 1 on each side, all becoming obsolete near the apex and behind the antennal insertions; scales mostly narrow, golden brown, recumbent except for erect basal tufts. Head reticulate, thinly covered with linear, recumbent, brown scales. Prothorax broadly rounded at sides, slightly constricted behind apex; closely covered with elliptical and setiform scales, which are mostly medium brown with patches of white at sides and a median white stripe reaching from base to near center (fig. 5); surface reticulate, not strongly shining; punctures small, convex at center, rather sparse (fig. 10). Elytra approximately as wide behind middle as across humeri (fig. 5); striae narrow, deeply impressed on declivity; intervals flat, closely covered with 2 rows of broad, subtruncate scales and a row of recumbent, slightly curled setiform scales, all of which are medium golden brown

and white, the white condensed into patches (fig. 5). Underside covered with white, and a scattering of brown, rounded scales. Femora clavate, unarmed, covered with elongate, pointed white scales. Tibiae nearly straight, slightly expanded toward apex, covered with rows of brown and white linear scales, and bearing a row of stiff setae on inner margin. Fourth tarsomere short, not extending beyond lobes of 3rd by more than half its length; tarsal claws short, fused for slightly more than half their length and almost parallel. Male genitalia (fig. 28) with median lobe (penis) more heavily sclerotized and pigmented at sides than above and below, slightly constricted behind the apex; internal sac minutely spiculate, armed with a pair of toothed helical scleromes; spiculum gastrale almost straight, slender, moderately expanded and slightly curved at anterior end; tegmen bearing a small cleft cap-piece. Paired setiferous pits of male propygidium as in fig. 14. Paired setiferous pits and surface texture of male pygidium as in fig. 20. Female genitalia with spiculum ventrale (fig. 36) broadly U-shaped at posterior end, moderately long, slightly expanded and curved at anterior end.

Females differ externally from males only in having the rostrum slightly longer, more tapered, and more polished before the antennal insertions.

Length: 1.45–2.10 (Av. 1.82) mm. Width: 0.65–0.87 (Av. 0.78) mm. Width of prothorax: 0.46–0.60 (Av. 0.54) mm. Length of prothorax: 0.46–0.55 (Av. 0.48) mm. N = 17.

Holotype: ♂, USNM No. 73237, labelled Usho (Swat), 8-VIII-69, Grub feeding in flower of *Cuscuta* sp. n., C.I.B.C. SW-8/69-751.

Paratypes: 7 ♂♂, 9 ♀♀, same data as for holotype, distributed to BM (2), CIBC (6), USNM (8).

This species is named for its type locality, Usho, in the Usho Valley of Swat, Pakistan. It is the *Smicronyx* species "C" that Ghani (1969) reported rearing from the fruits of *Cuscuta*, n. sp. and for which he reported some oviposition tests. It resembles the related *Smicronyx ghani* n. sp. in many respects, including the helical scleromes on the internal sac of the male genitalia and in the surface features of the propygidium and pygidium of the male, but differs from that species as indicated in the key.

Smicronyx parafasciatus Anderson, new species

fig. 7, 15, 21, 29, 37

Body and appendages medium reddish brown throughout, except for a narrow dark sutural stripe on elytra and dark bases of femora. Rostrum moderately thick and curved, not strongly tapered; lightly punctured, not carinate dorsally; a single carina present on each side above antennal insertions; thinly covered with recumbent yellowish setiform scales behind antennal insertions and bearing 2 erect tufts of broader white scales at base. Head reticulate, thinly covered with short yellowish scales. Funicle of antenna bearing linear white scales that become progressively longer toward club. Prothorax broadly rounded at sides in basal half, strongly narrowed and slightly constricted behind apex (fig. 7); dorsal punctures lenticular, subconfluent, and arranged in concentric, anterolaterally

curved rows, with interspaces between them raised into low rugae; dorsal and lateral surfaces thinly covered with flat, recumbent, spatulate yellowish scales, intermixed with a few curled, white setiform scales. Elytra distinctly broadest behind the middle and tapering to a rather narrowly rounded apex (fig. 7); unevenly covered with yellow to white, ovate to subquadrate scales concentrated in the humeral areas, at base of 3rd intervals, and in 2 wavy bands situated behind middle of elytra (fig. 7), with intervening areas thinly covered with oblong reddish-brown scales; striae narrow, with elongate, deeply impressed punctures; intervals each bearing 2 rows of flat scales and 1 row of curled, setiform scales. Underside of thorax and abdomen slightly darker than dorsum, sparsely covered with narrow greyish scales. Femora distinctly clavate, 1st pair strongly so, and bearing a small subapical ventral tooth, which is strongest on the hind pair; scales white, elongate, curled, and rather sparse. Tibiae straight, almost slender, sparsely covered with linear scales and bearing a row of 7-8 stiff semi-erect setae along inner margin. Third tarsomere conspicuously broader than second and deeply bilobed. Fourth tarsomere exceeding 3rd by approximately half its length; tarsal claws moderately long, fused in basal half. Median lobe (penis) of male genitalia short, tapering from base to apex, pigmented dorsally and laterally but not ventrally; internal sac bearing tiny spines but no other armament; tegmen bearing a short, bifid cap-piece (fig. 29); spiculum gastrale rather thick, nearly straight, its anterior end curved and slightly expanded. Paired setiferous pits of male propygidium as in fig. 15. Surface texture and paired setiferous pits of male pygidium as in fig. 21. Spiculum ventrale of female genitalia (fig. 37) with arms forming a rather elongate, angular U; moderately long; flattened but not curved at anterior end.

Females may be distinguished from males on the basis of the more elongate, more terete and smoother rostrum.

Length: 1.90-2.70 (Av. 2.35) mm. Width: 0.85-1.20 (Av. 1.06) mm. Width of prothorax: 0.52-0.80 (Av. 0.72) mm. Length of prothorax: 0.50-0.75 (Av. 0.64) mm. N = 51.

Holotype: ♂, USNM No. 73238, labelled Beha Swat, Pakistan, 12-IX-69, C.I.B.C. SW-9/69/765.

Paratypes: 25 ♂♂, 26 ♀♀, from Pakistan, with the following collecting data: Beha, 12-IX-69, adult on flower of *C[uscuta] reflexa* var. *brachystigma*; Gabral (Swat), 27-VII-68, larva feeding in flower of *Cuscuta* sp., 7-VIII-69, grub feeding in flower of *C[uscuta] planiflora*, 9-IX-69, adult from *C[uscuta] reflexa*, 12-VIII-72, adult on *Cuscuta reflexa anguina*; Marghuzar, 20-VII-69, adult on *C[uscuta] reflexa*, same locality & host, 14-VIII-72; Otrora, 17-VII-69, adult on *C[uscuta] planiflora*, 8-VIII-69, adult on *C[uscuta]* red thick vine, 19-VII-72, adult on *Cuscuta reflexa anguina*; Usho, 8-VIII-69, adult on *C[uscuta] planiflora*, same locality & date, adult on red thick *C[uscuta]*. Distributed to BM (4), CIBC (20), USNM (20).

S. parafasciatus is the *Smicronyx* species "B" that Ghani (1969) reported finding (in the larval stage) in peduncles and bases of flower clusters of *Cuscuta* species in Pakistan.

I have named this species with reference to its general resemblance to *Smicronyx fasciatus*, described from Burma by Motschulsky (1858).

My comparison is based on the original description and a specimen (det. G. A. K. Marshall) from Saigon, S. Vietnam, in the British Museum. The 2 species are similar in general proportions, habitus, and coloration, but in *S. parafasciatus* the prothorax is more distinctly constricted at the sides, the fasciate pattern of elytral scales is less distinct, and the light scales are more yellowish.

I consider this species also related to *Smicronyx inornatus*, n. sp. and to *S. albovariegatus* Faust (which I have examined in the BM and USNM collections). Neither of the latter 2 species have the subconfluent pronotal punctures and distinctly banded elytral scale pattern found in *S. parafasciatus*, but they are similar to that species in body color, dentate condition of femora, and shape of male genitalia (fig. 29, 30, 32).

Smicronyx inornatus Anderson, new species

fig. 8, 16, 22, 30, 38

Body and appendages dark to medium reddish brown throughout. Vestiture translucent greyish white, tinted with brown or yellow. Rostrum of moderate thickness and curvature, bearing 3 dorsal carinae of which the median is thin, becoming divided and obsolete near the apex, and 2 more prominent lateral carinae, also ending before the apex; punctures between carinae not conspicuously large or deep; clothed with curled, recumbent scales from antennal insertions to base, and bearing 2 erect basal tufts of scales. Antennal club elongate-ovate, approximately half as long as funicle. Head finely reticulate, thinly covered with prostrate scales near base of rostrum. Prothorax nearly as long as wide, convex dorsally and laterally, widest near middle, narrowed and slightly constricted behind apex; punctures rounded, shallow, not closely spaced; thinly covered with flat elliptical scales; a short median basal vitta of nearly white scales present. Elytra distinctly widest behind their midlength; inconspicuously marked with a dark sutural line; scales thinly covering surface, and the lightest (nearly white) condensed into a short vitta at base of 3rd interval, a faint band before and behind the middle, and into an elongate patch covering intervals 6-8 (fig. 8); each interval bearing 2-3 rows of flat whitish elliptical scales and 1 row of curled, brownish setiform scales. Underside thinly covered with elliptical, mostly subtruncate, scales. Femora distinctly clavate; armed with a small, ventral subapical tooth; thinly covered with a mixture of elliptical and elongate whitish scales. Tibiae fairly stout, thinly covered with elongate, pointed, whitish scales and bearing a row of several stiff, semi-erect setae on inner margin. Third tarsomere deeply bilobed and broader than second; last tarsomere projecting for more than half its length beyond third. Tarsal claws fused for slightly less than half their length and slightly divergent. Median lobe (penis) of male genitalia stout, subparallel at sides, heavily pigmented dorsally and laterally; internal sac microspiculate but without other armature (fig. 30). Spiculum gastrale of male slightly curved throughout its length, strongly curved at anterior end. Paired setiferous pits of male propygidium as in fig. 16. Surface texture and paired setiferous pits of male pygidium as in fig. 22. Spiculum ventrale of female genitalia rather long, arms forming a U, anterior end flattened and slightly expanded (fig. 38).

Females can be distinguished from males by the rostrum, which is noticeably smoother and more terete before the antennal insertions.

Length: 1.95–2.80 (Av. 2.25) mm. Width: 0.93–1.22 (Av. 1.06) mm. Width of prothorax: 0.60–0.75 (Av. 0.65) mm. Length of prothorax: 0.56–0.75 (Av. 0.63) mm. N = 10.

Holotype: ♂, USNM No. 73239, labelled Sor Range [Quetta Division, Pakistan], 7-7-[19]67, adult on stem *Cuscuta gigantea*, C.I.B.C., C-G-7/67-9.

Paratypes: 6 ♂♂, 4 ♀♀, same locality and host as holotype, dated 7-7 or 7-8, [19]67. Distributed to BM (2), CIBC (4), USNM (4).

This species resembles *Smicronyx parafasciatus*, n. sp. with respect to general body form and color, the faintly banded elytral scale pattern, and the short dark median lobe of the male genitalia. However, it differs from the latter species as indicated in the key and in having the sides of the median lobe subparallel, rather than converging toward the apex.

S. inornatus more closely resembles an undescribed species from India, represented in the U.S. National Museum collection by a series collected at Mangalore on "*Gerardia*?" in September, 1926, and by 1 specimen collected at Hammanaki, Mysore, feeding on *Sopubia delphinifolia* in October 1969. This resemblance is strong with respect to general body proportions and color, dorsal punctures on the prothorax, color of the vestiture, shape and pigmentation of the median lobe of the male genitalia, and shape of the setiferous pits on the propygidium of the male, but there are some minor differences, such as the shape of the elytra, which are not broadest behind their mid-length in the undescribed Indian species, and the elytral scale pattern, in which the whitest scales are condensed into a small patch just behind the middle of each elytron in the undescribed species. With respect to the same characters, *S. inornatus* resembles *S. albovariegatus* Faust (associated with *Striga* species in India, according to Khan and Murthy, 1955, and data with specimens in the BM and USNM collections), but differs from that species in the same ways, and also has a more convex prothorax, differently shaped propygidial pits (fig. 16, 18), and a less tapered median lobe in the male (fig. 30, 32).

Smicronyx rufovittatus Anderson, new species

fig. 6, 17, 23, 31, 39

Surface color of body and appendages ranging from brownish red to black. Rostrum deep reddish brown, moderately curved, tapered only near apex; bearing 4 dorsal carinae, of which the median 2 are fused in the basal $\frac{1}{3}$, and 1 lateral carina (on each side), as long as dorsal carinae; densely covered, except near apex, with curled recumbent brownish scales; basal tufts of scales white, erect. Head reddish brown, its surface reticulate, thinly covered with narrow golden

brown scales. Antennae reddish black, scales becoming longer and narrower from scape to club, which is densely covered with silvery pubescence. Prothorax deep reddish brown, slightly wider than long, broadly rounded at sides, strongly narrowed and slightly constricted behind apex; punctures nearly round, coarse, evenly spaced; scales broad, flat, golden brown or white, mixed with strongly curled dark brown or white, the white condensed into a basal patch on each side and into a short median basal vitta. Elytra widest across the humeri, subparallel to the declivity, then narrowed to a broadly rounded apex; surface dark along a broad sutural stripe, distinctly reddish along a broad stripe toward the outer margin; scales reddish brown, variegated with dark brown and white, the reddish brown condensed on the reddish stripe, the white in clusters, and the dark brown condensed on the dark surface areas (fig. 6); striae narrow and sharply impressed, intervals flat, bearing 2 rows of broadly elliptical scales and 1 row of prominent, curled, recumbent setiform scales. Underside of thorax and abdomen dark to medium reddish brown, thinly covered with white spatulate scales. Femora reddish brown, armed with a small ventral tooth, and thinly covered with elongate white scales. Tibiae almost straight, reddish brown, armed with a row of 6-7 stiff setae on inner margin and thinly covered with linear white scales. Tarsi densely covered with white vestiture above; third tarsomere slightly wider than second; fourth tarsomere exceeding third by approximately half its length; claws slightly divergent, fused for slightly less than half their length. Male genitalia with median lobe (penis) lightly pigmented throughout, tapering slightly toward apex, and bearing only microspiculi on the internal sac; tegmen bearing a short cap-piece cleft for about half its length; spiculum gastrale slender, slightly bowed throughout its length and hooked at anterior end. Paired setiferous pits of male propygidium as in fig. 17. Surface texture and paired setiferous pits of male pygidium as in fig. 23. Female genitalia with the spiculum ventrale (fig. 39) forming an angular U-shaped fork at posterior end, distinctly flattened and expanded at anterior end.

Females differ externally from males in having the apical end of the rostrum slightly more tapered and smooth before the antennal insertions.

Length: 1.65-2.00 (Av. 1.82) mm. Width: 0.76-0.95 (Av. 0.84) mm. Width of prothorax: 0.50-0.60 (Av. 0.55) mm. Length of prothorax: 0.43-0.56 (Av. 0.50) mm. N = 14.

Holotype: ♂, USNM No. 73240, labelled Nowshera [Peshawar State, Pakistan], 19-V-69, larvae feeding in *C[uscuta] campestris* fruit, C.I.B.C. SW 5/69-IV-472.

Paratypes: Nowshera Pakistan, 13-IX-69, Grub feeding in flower of *C[uscuta] campestris*, C.I.B.C. SW 9 69-772, 4 ♂♂, 1 ♀ (3, CIBC, 2 USNM); [same locality], 19-V-69, Larva feeding in *C[uscuta] campestris* fruit, C.I.B.C. SW 5, 69-IV-742, 7 ♂♂, 2 ♀♀ (2, BM, 4, CIBC, 3, USNM).

This species is the *Smicronyx* species "D" of Ghani (1969), who reported that it had been collected and reared from *Cuscuta campestris* Yuncker at Nowshera, and set forth the results of some tests of its oviposition preferences. Its specific name was suggested by the reddish stripes on its elytra, which will serve to distinguish it from the other species treated in this paper. The species most closely resembling *S.*

rufovittatus are *S. albovariegatus* Faust and the undescribed species from India already mentioned (in my discussion of *S. inornatus* n. sp.), which it resembles in body shape and proportions, punctuation of prothorax, color (except for their lack of reddish elytral stripes), general features of the vestiture, shape of median lobe of male genitalia (fig. 31, 32), and (in *albovariegatus*) surface features of the male propygidium and pygidium (fig. 17, 18, 23, 24). With respect to the shape of the male genitalia, *S. parafasciatus* n. sp. and *S. inornatus* n. sp. also resemble this species.

As mentioned by Williams and Caswell (1959) and by Anderson (1962, 1970), species of *Smicronyx* are known to be associated with parasitic plants belonging to 3 families, i.e. Convolvulaceae, Scrophulariaceae, and Orobanchaceae.² The fact 3 species of *Smicronyx* (*rufovittatus*, *parafasciatus*, and *inornatus*) associated with *Cuscuta* (Convolvulaceae) are related to *S. albovariegatus* and the undescribed species from India, which are known to be associated with parasitic Scrophulariaceae, may be of significance to further understanding this rather unique range of host-plant preferences.

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REFERENCES

- Anderson, D. M. 1962. The weevil genus *Smicronyx* in America north of Mexico. Proc. U.S. Nat. Mus. 113:185-372.
- . 1970. Dodder weevils in simultaneous association with parasitic plants and parasitic plants and their hosts. Science. 168:132-133.
- Faust, J. 1885. Turkestanische Rüsselkäfer. Stett. Entomol. Zeit. 46:149-202.
- . 1886. Verzeichniss der von den Herrn Wilkins und Grumm-Grashimailo in Turkestan, Buchara, und im Pamir gesammelten Curculioniden. Hor. Soc. Entomol. Ross. 20:141-178.
- Ghani, M. A. 1969. Annual Report, "Biologies and host-plant ranges of insects that attack noxious weeds common to Pakistan and the United States," P.L. 480 Project No. A17-ENT-14, 1968-1969, 32 pp. C.I.B.C., Pakistan Station, Rawalpindi.

² Detailed discussions of the parasitic nature of various plant genera belonging to these families may be found in Kuijt, 1969.

- Hoffmann, A. 1958. Faune de France, 62. Coléoptères Curculionides (Troisième Partie). Lechevalier, Paris. 630 pp.
- Khan, M. Q. and D. V. Murthy. 1955. *Smicronyx albovariegatus* Faust (Curculionidae: Coleoptera) on *Striga* spp. Indian Journ. Entomol. 17(3):362 (pub. Mar. 1956).
- Klima, A. 1934. Coleopterorum catalogus, pars 140, Curculionidae: Eirrhiminae. pp. 1-167, 's-Gravenhage.
- Kuijt, J. 1969. The biology of parasitic flowering plants. Univ. Calif. Press, Berkeley & Los Angeles. 246 pp.
- Marshall, G. A. K. 1923. On new species of Curculionidae from India. Ann. Mag. Nat. Hist., ser. 9, 12:281-300.
- . 1952. Taxonomic notes on Curculionidae (Col.). Ann. Mag. Nat. Hist., ser. 12, 5(51):261-272.
- Motschulsky, V. de. 1858. Entomologie speciale. Insectes des Indes Orientales. Etud. Entomol., pt. 7, pp. 20-122.
- Williams, C. N., and G. H. Caswell. 1959. An insect attacking *Striga*. Nature. 184(4699):1668.